

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. Patent Application Serial No., 09/216,348, filed August 9, 2002, which is a continuation of U.S. Patent Application Serial No., 09/689,254, filed October 11, 2000, U.S. Pat. No. 6,450,171, which is a continuation of U.S. Patent Application Serial No., 09/235,664, filed January 22, 1999, U.S. Pat. No. 6,221,104, which is a continuation-in-part of U.S. Patent Application Serial No. 09/071,817, filed May 1, 1998, U.S. Pat. No. 6,024,096.

Please replace the paragraph starting on page 13, line 8 with the following:

The shape of the normal heart 12 is of particular interest as it dramatically affects the way that the blood is pumped. It will be noted, for example, that the left ventricle 25, which is the primary pumping chamber, is somewhat elliptical, conical or apical in shape in that it is longer than it is wide and descends from a base 35 with a decreasing cross-sectional circumference, to a point or apex 37. The left ventricle is further defined by a lateral ventricle wall 38, and a septum 41 which extends between the atrium 18, 23, and between the ventricles 21, 25. The mitral valve 34 is situated in an antero-ventricular junction which extends laterally between the atrium 18, 23, and ventricles 21, 25. The "base" of the inferior muscle is also in this general location. This wide base 35 extends to the apex 37 on the inferior cardiac surface. In the area of the base 35, the muscle is relatively flat or slightly spherical compared to the curvilinear form in the anterior wall. The muscle fiber orientation is maintained at approximately 60 degrees from base 35 to apex 37 to maintain the torsional gradient which facilitates ejection. This orientation of fibers changes to accentuate ejection, with less twisting at the base 35 and more twisting at the apex 37.

Please replace the paragraph starting on page 21, line 16 with the following:

The sheet material 81 can have a generally flat planar configuration, or can be shaped as a section of a sphere. The spherical shape can be achieved as illustrated in FIG. 12B by fixing the pericardium while it is stretched over a spherical die to form a concave surface 89.

Please replace the paragraph starting on page 23, line 20 with the following:

When all of the interrupted sutures 105 have been placed around the circumference of the neck 87, the patch 72 can be moved from its remote location along the sutures 105 and into proximity with the oval neck 78. This step is illustrated in FIG. 22A where the patch 72 is embodied with the concave surface 89 facing the neck 78 and with the ring 87 disposed outwardly of the material 81. After the patch 72 has been moved into an abutting relationship with the neck 78, the interrupted sutures 105 can be tied as illustrated in FIG. 23.

Please replace the paragraph starting on page 27, line 22 with the following:

As the incision is opened and the non-contracting regions 128 on either side are laid back, a line of separation 137 can be located between the non-contracting region 128 and contracting regions designated generally by the reference numeral 140. Basting sutures 142 are placed generally along this line of separation 137. These basting sutures 142 include a base suture 143 which extends between pledges 146 and 144 along the base 37. Similarly, lateral basting sutures 148 and 157 can be placed to extend along the line of separation 137 between pledges 153 and 155, and pledges 157 and 160, respectively. In a preferred orientation, the lateral basting sutures 148 and 157 meet at a basting apex 162 and diverge to individually intersect the basting sutures 142 at the base 37. Thus, the basting sutures 142, 148 and 157 form a triangle along the line of separation 137.

Please replace the paragraph starting on page 30, line 13 with the following:

It is believed that cardioplegia arrest may be deleterious to ventricular function in the open ventricle because of nonuniform flow distribution. By avoiding this cardioplegia arrest and operating on a beating heart, aortic cross clamping as well as the use of inter-aortic balloons and ventricular assist devices can be avoided. Patch placement can be intraoperatively adjusted guided by echo or radio nucleotide data. Placement of the patch is further simplified by creation of the Fontan neck 78 or triangular neck, and use of interrupted felt or pericardial pledgedged sutures 105. The circumferential rim 93 associated with the patch 72 facilitates bleeding control without distortion of the patch 72. Finally, using a vest-over-pants closure of

the excluded ventricle obliterates dead space and provides security against patch leaks and resultant expansion between the site of closure of the ejecting ventricle with the patch, and where the excluded muscle is closed by the excluded ventricle.

Please replace the paragraph starting on page 31, line 3 with the following:

Within these wide objectives and parameters, there will be variations on the structure of the patch and the methods of restoration. Although the non-circular configuration of the sheet material and ring are believed to be critical, the shape of the patch 72 may vary widely to provide the best anatomical fit with the natural shape of the ventricle 25. The sheet material 81 may be composed of a variety of materials, both natural and artificial. These materials may be woven or nonwoven to achieve a desired structure for the sheet material 81. The ring 87 may similarly be formed from a variety of materials and provided with a variety of shapes in order to add structure to the patch 72 without interfering with the normal contractions of the heart 12. Variations of the steps of the associated restoration method might include mounting the patch with a convex surface facing the ventricular cavity, use of tissue adhesives are also contemplated for attaching sealing and otherwise fixing the patch 72 to the Fontan neck 78 or the triangular neck.

In the Claims:

Please cancel claims 1-6.

Please add the following new claims:

7. (New) A method for restoring the ventricular architecture of a heart having an anterior wall and an inferior wall, comprising the steps of:

creating an incision in the inferior wall of the heart to expose an inner surface of the ventricle of the heart;

forming a suture line around the inner surface of the inferior wall;